DETAILED ACTION

Election/Restrictions

1. This application contains **claim 20** drawn to an invention nonelected with traverse in the reply filed on June 5th, 2009. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 8** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "wherein in process step d1" in line 1. There is insufficient antecedent basis for this limitation in the claim since step d1 has been deleted from claim 1. Since d1 was deleted in order to require step d2 instead, claim 8 is directed towards an alternate embodiment of the process which is not currently claimed. Thus there is no correct place to interpret its limitations under in the currently claimed invention and examination on its merits is precluded.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

> the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1, 3-7, 9-14 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams (US 20020183413) in view of Bauer et al (US 6548121)

Williams teaches a process for forming strongly adhering layers on metal substrates (abstract). It teaches that the process includes making an UV curable composition including a photoinitiator and monomers and/or oligomers which are ethylenically unsaturated (e.g. vinyl acetate) [0048-0049] and applying it to a substrate then curing the composition by effective UV irradiation for a dosage effective to produce a desired degree of crosslinking. Then coating the cured layer with a top coating [0050-0052], which can be surface coating ink [0046].

Williams does not teach pretreating the metal substrate with a low temperature plasma. However, Bauer is also directed towards strongly adhering coatings which comprise photoinitiator and ethylenically unsaturated groups which are deposited onto inorganic (metal[col 6, lines 59-60]) substrates and cured with UV radiation (abstract). It teaches that before applying the photoinitiator composition (at normal pressures) to the metal substrate, the metal substrate should be exposed to

a low temperature plasma treatment (col 1, line 59 to col 2, line 10) in order to obtain improved adhesion (col 1, lines 9-20).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to perform a low temperature plasma treatment of the metal substrate as taught by Bauer before coating it with the photoinitiator composition in order to improve the adhesion of the deposited layers.

Williams does not specifically teach aluminum as the metal substrate. However, Bauer teaches that aluminum substrates are of particular interest for coating with photoinitiator compositions for improved adhesion metal (col 6, lines 59-60).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use an aluminum substrate because it was recognized to be a substrate in need of adhesion improving coatings which would produce no more than predictable results.

Williams teaches depositing the photoinitiator composition by spraying, dipping, normal deposition methods [0046] or rolling [0067], but does not teach controlling or changing the pressure the substrate is under in order to do so (nor would such a change be required in order to perform any of the deposition methods described). Additionally, Bauer teaches that photoinitiator compositions for improving adhesion can be deposited at normal pressures(col 2, lines 1-5). Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use normal pressures in order to deposit the coating at least because it

is simpler and less expensive than controlling the pressure and normal pressures were known to the art to be suitable for performing such depositions.

As discussed, Williams recognizes that the UV light used and the dosage are result effective variables for determining the efficacy of the curing treatment. Likewise Bauer recognizes lamps producing UV radiation between 250 nm and 450 nm to be a suitable wavelength for UV light for curing photoinitiators (col 17, lines 52-55).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use UV wavelengths between 250 nm and 450 nm for curing the composition because such wavelengths were known to be effective for that purpose.

Thus it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "10-200 mJ/cm^2" through process optimization to produce the effective degree of curing for a particular polymer composition deposited in a particular thickness through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding the requirement that the top coating be made of a printing ink, Williams teaches coating the cured layer with a top coating [0050-0052], which can be a pigmented [0052] ink [0046], but it does not refer to it as a printing ink. However, Bauer teaches that effective thicknesses for pigmented surface coatings are preferably between 1 and 40 microns in thickness (col 19, lines 49-57).

According to applicant's specification, when pigmented coatings are less than 50 microns in thickness the composition is referred to as a "printing ink."

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to choose a pigmented top coating thickness of between 1 and 40 microns, because such thicknesses were known to be particularly preferred thicknesses for pigmented coatings, which would be considered by applicant to be coated with "printing ink."**(claim 1)**.

4. Regarding **claim 3**, Williams teaches that benzyl ketals are appropriate photoinitiators [0048].
5. Regarding **claims 4-6,** Williams does not appear to exemplify these photoinitiators. However, Bauer teaches that effective photoinitiators include a subset of the formulas of **claim 4** (col 6 line 61 through col 7, line 8). In which (IN) is further preferably limited by a subset of the formulas of **claim 5** (col 7, line 9 through col 8, line 4). In which (RG) and (RG') are further especially preferably limited by a subset of the formulas of **claim 6** (col 8, line 65 through col 9, line 10). Additionally, example 1 teaches using a photoinitiator which meets the limitations of **claims 4 and 5** (col 23, lines 29-40).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use the photoinitiators taught by Bauer in the process of Williams because they were known to be effective photoinitiators sutiable for strongly adhering layers **(claims 4-6)**.

6. Regarding **claim 7**, Williams teaches including liquids in the composition in order to render it a solution [0044].
7. Regarding **claims 9-10**, In example 1, Bauer exposes the substrate to a plasma formed from a mixture of argon(inert) and oxygen(reactive)(col 23, lines 24-27) **(claims 9-10).**
8. Regarding **claim 11**, Williams teaches that the thickness of the film is controlled which affects at least its curing behavior [0050]. Thus it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "a layer thickness up to 500nm" through process optimization to produce the effective degree of curing for a particular polymer composition during a particular curing treatment through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980)**(claim 11)**.
9. Regarding **claim 12,** Bauer teaches performing the application of the photoinitiator composition (step "b") as soon as possible after the corona discharge treatment (process step "a") and suggests doing so in a continuous process (col 15, lines 15-20). Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to perform step "b" immediately after step "a," since that was taught to be desirable after performing the plasma treatment.
10. Regarding **claim 13,** Williams teaches it is typical to use 0.01 to 8 weight percent of the photoinitiator in the composition based on the weight of the non-volatile

ethylenically unsaturated content of the coating composition [0048]. MPEP 2144.05 (II) states: "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'"

11. Regarding **claim 14**, Williams does not teach how long the wait is between steps b and c. However, Bauer teaches the desirability of having a high throughput per unit time (col 1, lines 50-51). The examiner takes official notice that waiting time between process steps is a well known variable for determining the maximum throughput per unit time of a process. Decreasing the waiting times between processing steps, decreases the total time for the overall process and increases the maximum throughput of a process.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to reduce the waiting times as much as possible and perform step “c” immediately after step “b” in order to allow for a higher throughput per unit of time as taught to be desirable by Bauer.

12. Regarding **claim 24**, Williams does not teach particularly teach using benzophenones as the photoinitiator [0048], however Bauer teaches that benzophenones are effective photoinitiators for such strongly adhering coatings (col 17, lines 60-65). Thus it would have been obvious to a person of ordinary skill in the

art at the time of invention to use benzophenones as the photoinitiator since it was known to be effective for that purpose.

13. **Claims 15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams (US 20020183413) in view of Bauer et al (US 6548121) as applied to claim 1, further in view of Kohler et al (US 6251963).

14. Regarding **claim 15**, Williams teaches that the composition deposited in step b is allowed to dry [0052], but it does not teach doing so with the claimed methods.

However, '963 is also directed towards depositing films of photoinitiators where liquid solvents are used with the photoinitiators in order to form a solution which is then deposited on the substrate (col 18, lines 31-48). Likewise, '963 teaches that after the substrate is coated with the liquid solution photoinitiator, the solvents are normally removed by drying (col 19, lines 29-31). However, '963 further teaches drying the photoinitiator films at elevated temperatures (col 25, lines 51-52) and that it is advantageous to dry photoinitiators at elevated temperatures under a vacuum (col 4, lines 39-42). The use of a reduced pressure environment with the heating step would require that the coating be heated inside a vacuum chamber, which would be, by definition, an oven.

Thus it would have further been obvious to a person of ordinary skill in the art at the time of invention to dry the photoinitator coating at elevated temperatures under a vacuum in an oven, since it was known to the art to be an advantageous method for drying photoinitiators and would produce predictable results **(claim 15)**.

15. Regarding **claim 17**, Williams does not teach patterning the strongly adhering layer. However, Bauer teaches that one of the uses for such strongly adhering layers made with photoinitiator organic compositions is for image forming coatings, such as those used in resist technology (col 23, lines 10-16), but does not say how such images are formed such as in resist technology.

However, '963 further teaches that images are formed by resist technology by covering parts of the wet or dry resist layer (the layer structure after depositing the monomer/oligomer containing layer and before UV/VIS exposure) with a photomask and then irradiating the layer with electromagnetic waves to crosslink a pattern in the resist (the UV/VIS exposure step) and removing the unexposed (not crosslinked) regions of the photoresist by using a solvent (col 21, lines 13-23).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to modify Williams in view of Bauer to cover the deposited structure of a photoinitiator layer and a monomer or oligomer containing layer with a photomask so that the irradiation step would only crosslink a pattern in the coating and then to remove the non-crosslinked regions of the coating (photoinitiator and monomer/oligomer) by using a solvent, in order to form an image in the coating (either the one deposited in step "b")as taught to be desirable by Bauer. Using this method is obvious, because it was a known method for producing an image in a photoinitiator layer and would produce predictable results **(claim 17)**.

16. **Claims 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams (US 20020183413) in view of Bauer et al (US 6548121) as applied to claim 1, further in view of Field (US 20030124339).

Williams teaches depositing on top of the UV curable primer layer (steps b-c) a “topcoating" material. It teaches that conventional thermal or UV curable topcoating materials can be used for the topcoating material, but it does not exemplify applicant's claimed materials for the topcoating layer. However, Field is also directed towards multilayer coatings on substrates with a curable primer layer and a curable top layer [0004]. It teaches that there are many conventionally known topcoating materials commercially available, with epoxy acrylates and urethane acrylates being effective for UV curable topcoating [0035]. Pigments can be added to the topcoating [0037].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use epoxy acrylates and urethane acrylates as the UV curable topcoating material because they were known to be effective materials to use as UV curable topcoatings which would produce no more than predictable results**(claim 23)**.

Response to Arguments

17. Applicant's arguments with respect to claims 1, 3-15, 17, 20 and 23-24 have been considered but are not convincing in view of the new ground(s) of rejection necessitated by amendment.

18. Regarding applicant's argument that Bauer does not teach aluminum substrates, as shown in the rejection, it does.

19. Regarding applicant's argument that a person of ordinary skill in the art would not be motivated to use Kohler's teaching of avoiding yellowing of the preventing photoinitiator in order to "solve the problem of obtaining strong adhesion of printing ink on aluminum or a substrate metalized with aluminum." However, the rejection does not seek to do that, so the argument is not dispositive to the rejection.

Conclusion

20. No current claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL HORNING whose telephone number is (571)270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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